STATEMENT OF WORK

NWS-R435-PR-WS001

for a

DOPPLER WEATHER RADAR SYSTEM

01 JULY 2000

Prepared by:
DEPARTMENT OF COMMERCE
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1.0 SCOPE. This Statement of Work (SOW) defines the work required to be performed by the Contractor to manufacture, assemble, and verify performance and Specification compliance of one or more Doppler weather radar(s). Site preparation, shelter fabrication, radar system delivery and installation, maintenance, and spares shall be provided if delivery orders are issued to the Contractor.

2.0 APPLICABLE DOCUMENTS. This section lists all the applicable documents referenced elsewhere in this SOW. The following documents, together with their first tier references, form a part of this SOW. All documents apply in full, except for limited application when specified herein. Unless specifically stated otherwise, the version of the document that applies is the version in effect on the date of issue of the solicitation.

2.1 NWS Specification. Copies of NWS documents are available from the National Weather Service, 1325 East-West Highway, W/OSO31, Silver Spring, MD 20910-2383. (301-713-1848)

NWS-R435-PR-SP001	Doppler Weather Radar Specification

2.2 Government and Commercial Documents. The following documents are available from the sources shown.

AC 70/7460-1K	Obstruction Marking and Lighting (FAA Advisory Circular)
ASME Y14.24M	Types and Applications of Engineering Drawings
ASME Y14.34M	Associated Lists
ASME Y14.35M	Revision of Engineering Drawings and Associated Lists
ASME Y14.100M	Engineering Drawing Practices
EIA-632	Systems Engineering
EIA-649	National Consensus Standard for Configuration Management
IEEE STD C95.1	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
MIL-HDBK-454	General Guidelines for Electronic Equipment

MIL-PRF-29612	Training Data Products
MUTCD	Manual of Uniform Traffic Control Devices (MUTCD)
NEC	National Electric Code
29 CFR Part 1910	Occupational Safety and Health Standards, ATSDR HazDat Database

a. Military documents and federal specifications are available from the Defense Printing Services, Bldg. 4/D, 700 Robbins Avenue, Philadelphia, PA, 19111-5094. These documents are also available over the INTERNET at http://astimage.daps.dla.mil/ quicksearch.

b. Federal Aviation Administration documents are available over the INTERNET at http://www.faa.gov/ats/ata/ guidelines.html.

c. Occupational Safety and Health Standards are available over the INTERNET at http://www.osha.gov/comp-link.html. The ATSDR HazDat Database is available over the INTERNET at http://www. atsdr.cdc.gov/hazdat.html.

d. IEEE documents are available from the Institute of Electrical and Electronics Engineers, Inc. Operations Center, Customer Service, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, or 1-800-678-4333. These documents are also available over the INTERNET at http://standards.ieee.org.

e. ISO, ANSI, and ASME documents are available from the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, New York 10036 (202-642-4900). These documents are also available over the INTERNET at http://web. ansi.org/public/std-info.html.

f. EIA documents are available from the Electronic Industries Alliance, 2500 Wilson Blvd. Arlington, VA 22201-3834 (703-907-7500). These documents are also available over the INTERNET at http://www.eia.org/eng/availability.htm.

g. The National Electric Code (NEC) is available from the National Fire Protection Association, Custodian of Documents, 470 Atlantic Avenue, Boston, MA 02210. This document is also available over the INTERNET at http://www.nfpa.org (products and catalogue).

h. The Manual on Uniform Traffic Control Devices (MUTCD) is available from the Government Printing Office (GPO), Superintendent of Documents, P.O. Box 371954, Pittsburgh, Pa 15250-7954. This document is also available over the INTERNET at http://www.mutcd.fhwa.gov.

2.3 Paragraph Referencing. When sections or paragraphs are referenced herein, all subordinate sections or paragraphs to those references shall apply.

2.4 Precedence of Documents. In the event of conflict or inconsistency between any aspect of the solicitation or resulting contract and the various portions of the SOW and documents incorporated by reference in the SOW, precedence shall be given in the following descending order, with the prevailing documents to be determined as follows:

a. The contract;
b. Statement of Work NWS-R435-PR-WS001;
c. Specification NWS-R435-PR-SP001; and
d. Referenced documents.

2.5 Miscellaneous. The following miscellaneous requirements shall be used for this SOW:

a. All days and schedules identified in this SOW refer to calender days;
b. All drawings, documentation, and software shall be prepared and submitted in the English language;
c. The Contractor shall notify the Government of any change to a test schedule within 24 hours of a change being identified; and
d. The Contractor shall successfully complete factory system testing on the Doppler weather radar system prior to delivery of the system.

3.0 REQUIREMENTS. The Contractor shall provide a radar to furnish a Doppler weather radar system meeting the requirements of Specification NWS-R435-PR-SP001 at a site to be selected by the Government. The Contractor shall manufacture, assemble, QA, factory test, deliver, install, acceptance test, maintain, and logistically support the Doppler weather radar system in a safe and environmentally responsible manner. All hardware, software, facilities, installation, interfaces, maintenance, support, and documentation for the system shall be provided by the Contractor as required in the Specification and this SOW.

All requirements of the Specification and this SOW, and the appendices of each, shall be levied by the Contractor on subcontractors, as applicable, to ensure the delivered system meets the requirements of Specification NWS-R435-PR-SP001 and this SOW.

3.1 Doppler Weather Radar System - Summary Requirements. The following five requirement categories comprise the hardware, software, and test requirement areas of this SOW.

3.1.1 Radar Acquisition System (RAS)and Remote Terminals. The RAS includes data acquisition hardware and software (except communications) necessary to collect, process, and display Doppler weather radar information and products. This category includes the remote terminal hardware and software located at the Weather Forecast Office (WFO). This category also includes the tower, auxiliary generator, and an uninterruptable power source.

3.1.2 Communications System. The communications system includes all hardware and software necessary to connect the RAS and remote terminals to the Government provided communication lines. The Contractor shall provide the communications equipment, including multiplexer and modem units, for installation at each end of the Government provided communications lines between the radar acquisition system site démarcation point and the WFO communications cabinet.

3.1.3 Radar Facilities. Radar facilities include all site preparation work, shelters, equipment, supporting hardware and software, delivery, installation, acceptance testing, and acceptance of the Doppler weather radar system at a Government selected radar site and the WFO.

3.1.4 Interface to the NEXRAD Meteorological Processor. This requirement includes interface hardware and software to provide data from the radar acquisition system to the NEXRAD meteorological processor within the WSR-88D radar System network.

3.1.5 Radar System Maintenance. Maintenance includes maintenance and repair of hardware and software necessary to keep the complete Doppler weather radar system, including radar facilities, operating satisfactorily at all times. Maintenance requirements exclude communication lines.

3.1.6 Supporting Categories and Requirements. Three additional categories of requirements that are necessary to support the radar include: spares and consumables; training; and radar engineering and technical services.

3.2 Program Management. The Contractor shall perform program management and engineering efforts required for the manufacture, factory test, delivery, installation, acceptance test, and maintenance of a safe and reliable Doppler weather radar system

in accordance with the Specification. Program management efforts shall include coordination and control, documentation, and reporting of program, contract, and product status.

3.2.1 Planning.

3.2.1.1 Progress Reviews. The Contractor shall plan, conduct, and support the following program management and engineering technical progress reviews at the Contractors facility or at a mutually acceptable facility:

a. Program Management Review (PMR) #1. Conduct 30 Days after Contract Award (DAC);

b. Preliminary Design Review (PDR) and Program Management Review #2. Conduct 120 DAC;

c. Program Management Review #3. Conduct 210 DAC;

d. Critical Design Review (CDR) and Program Management Review #4. Conduct 300 DAC;

e. Test Readiness Review (TRR) and Program Management Review #5. Conduct 400 DAC; and

f. Program Management Review #6. Conduct 490 DAC.

3.2.1.2 Program Schedules and Milestones. The Contractor shall develop a program schedule of significant events and activities to effectively meet program and contract milestones. The Contractor shall maintain the program schedule and provide updated progress at each PMR. Program schedules and milestones shall be in Contractor format but separated into the requirement categories defined in 3.1. Milestones shall include engineering, management, manufacturing, performance test verification, site visits, site preparation, delivery, installation, maintenance, and acceptance events and activities.

3.2.1.3 Program Management Review (PMR). Each PMR shall address specific events and issues of concern. An agenda shall be prepared for each PMR and shall include detailed topical subjects organized within the requirement categories defined in 3.1. The final minutes for each PMR shall include all documents provided or presented at the PMR. All final PMR documents shall be provided with meeting minutes. The content for each PMR handout or product shall be in accordance with Appendix A.

3.2.1.4 PMR Reporting. The Contractor shall prepare program, contract, and management status reports and present them at each PMR. The Contractor shall prepare the agenda and minutes of the Program Management Review (PMR), and all other program meetings, design reviews, and technical reviews. Agendas shall be submitted at least 7 days prior to each meeting. Meeting minutes shall be submitted 10 days after each meeting. Twenty days after receipt of the review minutes, the Government will provide: (1) Approval, (2) Contingent Approval, or (3) Disapproval. Agendas, minutes, and progress reports shall be in Contractor format.

3.2.2 Preliminary Design Review (PDR). The Contractor shall conduct a PDR in accordance with EIA-632. The PDR shall address technical issues and specific events and issues of concern within the requirement categories defined in 3.1. The draft PDR data package shall include a detailed topical discussion by category. The Contractor shall prepare and submit the draft PDR data package 10 days prior to the PDR in accordance with Appendix B. The final PDR data package shall include all documents provided or presented at the PDR and shall be provided with the meeting minutes.

3.2.2.1 PDR Location. The Contractor shall conduct the PDR at the Contractor's facility or a mutually acceptable facility.

3.2.2.2 Engineering Design Disclosure. The Contractor shall disclose to the Government the necessary preliminary design, engineering, and analyses information sufficient to allow the Government to independently evaluate whether the Contractors Doppler weather radar system shall meet the Specification requirements. Engineering design data shall identify all Specification requirements and other characteristics which will comprise the Doppler weather radar system. The Contractor shall document all designs, analyses, engineering products, and engineering test results to support the PDR in accordance with the requirements of Appendix C. The Contractor shall provide engineering design studies and analyses reports performed by or available to the Contractor under this Contract to the Government, including reports of analyses assigned by the Government.

3.2.3 Critical Design Review (CDR). The Contractor shall develop, document, and perform detailed engineering design and analyses in accordance with EIA-632. Detailed design shall be sufficient to manufacture, assemble, QA, maintain, and verify performance of the Doppler weather radar system. The Contractor shall conduct a CDR to address technical issues of concern and specific events within the requirement categories defined in 3.1. The draft CDR data package shall include a detailed topical discussion by category. The Contractor shall prepare and submit a draft CDR data

package 10 days prior to the CDR in accordance with Appendix B. The final CDR data package shall include all documents provided or presented at the CDR and shall be provided with the meeting minutes.

3.2.3.1 CDR Location. The Contractor shall conduct the CDR at the Contractor's facility or a mutually acceptable facility.

3.2.3.2 Engineering Design Disclosure. The Contractor shall disclose to the Government the necessary detailed design, engineering, structural, and analyses information in sufficient detail to allow the Government to independently determine that the Contractor's Doppler weather radar system shall meet the Specification requirements. Engineering design shall identify all Specification requirements and other characteristics which will comprise the Doppler weather radar system. The Contractor shall document all designs, analyses, engineering products, and engineering test results to support the CDR in accordance with the requirements of Appendix C. The Contractor shall provide engineering design and analyses reports to the Government, including reports of analyses assigned by the Government.

3.2.3.3 Environmental Analysis (EA). The Contractor shall perform an analysis of the RAS, remote terminals, and communications system manufacturing processes to determine the use of any chemicals listed in the Hazardous Substance Release/Health Effects database. As required or as necessary, analysis or test shall be performed to determine the concentrations of any chemical used in the RAS, remote terminals, and communications system manufacturing processes in the database. For any environmental analysis performed by or available to the Contractor, the Contractor shall provide a report to the Government at the CDR in accordance with the requirements of Appendix C.

3.2.4 Technical Interchange Meetings. The Contractor shall plan, support, and conduct technical interchange meetings. The purpose is to review system technical and operational issues and capabilities, and to review the Contractor's system engineering efforts as the system proceeds through manufacture, factory testing, installation, and operation. The Government reserves the right to hold up to four technical interchange meetings per year. All technical interchange meetings shall be conducted at the Contractor's facility or at a mutually acceptable facility. Documents shall be provided in accordance with Appendix B.

3.2.5 Reliability, Maintainability, and Availability. The Contractor shall provide documented reliability, maintainability, and availability (RMA) data for all equipment. Preliminary RMA data shall be provided at the CDR. Final RMA data shall be provided at the factory TRR.

3.2.6 Configuration Management.

3.2.6.1 Configuration Management Plan (CMP). The Contractor shall provide a CMP describing the policy and procedures necessary to establish configuration management controls for the manufacture and operating life of the Doppler weather radar system as described in Appendix J. The CMP shall describe the processes, methods, and procedures to be used to manage the functional and physical characteristics of the radar system configuration. The Contractor shall deliver the CMP for Government review and approval 90 days prior to the scheduled completion of factory testing.

3.2.6.2 Configuration Control. The Contractor shall establish and maintain configuration management and control in accordance with the Government approved CMP and the guidance of EIA Standard 649. The Contractor shall identify and control all configuration items upon Government approval of the product configuration baseline. Following the establishment of the product configuration baseline, the Contractor shall not change or modify any Doppler weather radar system hardware or software configuration without prior approval of the Government.

3.2.6.3 Configuration Changes. The Contractor shall submit documented change requests, product baseline configurations, and baseline variances to the Government in accordance with the procedures identified in the CMP.

3.2.7 Documentation and Data.

3.2.7.1 Data Requirements. The Contractor shall prepare and submit required data to the Government. The required data content is contained in this SOW and in the appendices to this SOW.

3.2.7.2 Document Quantity and Review Requirements. For each document required, the Contractor shall provide to the Government the following copies of documents:

a. The original letter and one (1) paper copy to the Contracting Officer;

b. Two (2) paper copies to W/OSO31 and three (3) paper copies to W/OSO43 (Operational Support Facility, Norman, Oklahoma). Hardcopy documents shall be submitted on 8½ x 11 paper. Foldouts shall be be on 8½ x 14 inch or 11 x 17 inch paper. All documents shall be in a 12-point font for text and either a 10-point or 12-point font for tabular data;

c. One (1) disk copy to W/OSO43. The disk copy shall be IBM-PC-compatible, 3.5 inch, high-density, computer disk or cd-rom in a mutually acceptable software application format; and

d. The Government shall have 60 calender days to review and comment on the preliminary versions of documents. The Contractor shall incorporate Government comments and deliver copies of the final documents, 30 calender days after receipt of Government comments. The Government shall have 30 calender days to review and accept/reject a final document. If rejected, the Contractor shall revise and resubmit the document within 15 days.

3.2.8 Radar Operator's Manual. The Contractor shall provide a Radar Operator's manual in accordance with Appendix D. The Radar Operator's manual shall be prepared and submitted to support test verification, installation and checkout, and operations. The Radar Operator's manual shall describe the technical characteristics, equipment, software, and operation of the Doppler weather radar system and equipment. The Radar Operator's manual shall include a chapter to identify: the conditions for determining a fault; the various conditions and processes for notifying the Contractors maintenance organization; the follow-up procedures for ensuring the repair is performed; and procedures to bring the system back on line. The Contractor shall also include a chapter on the interface to the NEXRAD Meteorological processor to support the installation, checkout, fault identification and isolation, testing, and operation of the interface. The delivered manual shall be in hard copy and electronic media. Electronic media shall be directly compatible with Government publishing systems and in a mutually acceptable format.

3.2.8.1 Preliminary Radar Operator's Manual. The Contractor shall prepare a preliminary manual to support factory testing. The preliminary manual shall be validated by the Contractor prior to submission to the Government. The Contractor shall submit the preliminary manual 30 days prior to the start of factory testing.

3.2.8.2 Final Radar Operator's Manual. As a part of factory testing, the Contractor shall update the preliminary operator's manual, perform validation, and submit the draft final manual 10 days prior to radar system installation. The Contractor shall submit a final manual 30 days after acceptance.

3.2.9 Radar System Drawings. The Contractor shall prepare and submit radar system drawings and associated lists produced or used in the performance of this contract in accordance with Appendix E. Radar system drawings shall be used: for configuration control; for the transportation of components or subsystems; for the safe installation and acceptance of the radar system; for the application and inspection of the radar

system during the operating permit process; and for the routine inspection of the radar system for renewal or upgrade purposes. Radar system drawings shall include arrangement drawings, installation drawings, interconnecting diagrams, and wiring diagrams. Preliminary copies of each drawing shall be provided at the PDR and CDR. A list of all required drawings shall be provide at the CDR for Government approval. A draft final copy of all radar system drawings shall be provided prior to the factory TRR. Final drawings shall be provided 30 days after acceptance of the Doppler weather radar system.

3.2.10 Government Representation. The Government shall have the option to provide representatives to witness factory testing, installation and checkout, and on-site acceptance testing.

3.3 Test Verification Documentation. Test documentation shall be provided in accordance with the Specification and Appendices G, H, and I. Once approved by the Government, test procedures shall not be updated or changed without prior written approval of the Contracting Officer's Technical Representative (COTR). Test verification shall not be performed until approval of the procedures is granted. The Contractor shall prepare test reports for each test performed and submit within 30 days after completion of each test. Test procedures shall be provided for each specific test within the following test categories:

a. Factory component testing;
b. Factory system testing;
c. Radar facility testing; and
d. Radar system acceptance testing.

Note: Interface developmental testing and evaluation is included in categories b and d.

3.3.1 General Test Documentation Requirements. The following general test documentation requirements are common to all parts of the weather radar testing. The Contractor shall satisfy these requirements in the preparation of the detailed test documentation and in the conduct of the required tests.

a. The Contractor shall provide test procedures for Government approval prior to initiation of any testing.

b. The Contractor shall update test documentation to reflect changes in testing methods or requirements.

c. The Contractor shall provide all test data inputs, software, instrumentation (properly calibrated), and personnel resources needed for testing.

d. Successful completion of testing will be used to define milestone accomplishments and to gauge progress both in accordance with Contract deliverable requirements, and the Contractor provided test plan.

e. Pre-test inspections shall be required prior to each test. Test inspections shall ensure that testing is in accordance with approved test procedures, and that prior deficiencies or discrepancies have been corrected. Test inspections shall also ensure that all test documentation and test equipment is available.

f. Completion of testing shall not in any way void any warranty, nor waive any requirements for delivery of a compliant system.

g. The Contractor shall re-test previously completed test verifications where it is judged by the Government that correction of a deficiency may affect the results of prior testing.

3.3.2 Test Documentation Requirements.

3.3.2.1 Test Plan. The Contractor shall prepare and submit a test plan that is divided into the test categories as identified in 3.3. The test plan shall describe in specific terms how all requirements of the Specification shall be satisfied. The test plan shall contain a detailed test schedule that identifies the start and end date of each test. The test plan shall serve as the basis for preparation of test procedures.

3.3.2.2 Test Procedures. The Contractor shall submit test procedures based on the specified test requirements. Separate test procedures shall be submitted within each test category defined in 3.3, to be performed as defined in the approved test plan. Test procedures shall include all requirements in the Specification test verification matrix.

3.3.2.3 Radar Performance Data Sheets. The Contractor shall provide Radar Performance Data Sheets consistent with the test procedures. The Radar Performance Data Sheets shall be used by the personnel conducting and witnessing the testing to record the results of each step in the test procedure.

3.3.2.4 Test Reports. The Contractor shall provide a test report to document the results of each test. The Contractor shall provide copies of the completed Radar Performance Data Sheets along with the test data. The Contractor shall provide other documents, listings, and supporting data required to document the results of testing.

3.4 Manufacturing and Factory Testing. The Contractor shall perform manufacturing, quality assurance, and factory testing to demonstrate the RAS, remote terminals, and communications system meets requirements of the Specification. The Contractor shall provide all factory or laboratory test facilities. The Contractor shall notify the Government, in writing, 15 days prior to each required factory test performed by the Contractor. The Government shall be notified of any change to a factory test schedule within 24 hours of a change being identified.

3.4.1 Manufacture and Quality Assurance (QA). The Contractor shall provide all hardware, software, manufacturing, and assembly in the factory necessary to produce a RAS, remote terminals, and communications system. The Contractor shall perform manufacturing QA using quality control methods, procedures, and techniques, and shall maintain a quality control system in accordance with a documented and industry certified QA Program. The Contractor shall perform the necessary QA tests and inspections to support the procurement of parts and components, and manufacture of equipment.

3.4.2 Software Programs. The Contractor shall develop, test, and document all software/firmware applications for the Doppler weather radar system. The Contractor shall provide software/firmware which meets the requirements of the Specification using a documented and industry recognized software quality control system. At the successful completion of the Doppler weather radar system acceptance testing, a Software Version Description shall be prepared to set the System Software Product Baseline. The Software Version Description shall be updated each time a change to the System Software Product Baseline is delivered. Software media and documentation shall be delivered in accordance with Appendix F. The Government reserves the right to inspect the Contractor's software quality control system throughout the term of the Contract. The master digital software/firmware copies shall be delivered to the Government concurrently with the delivery of the Doppler weather radar system.

3.4.3 Factory Test Readiness Review (TRR). The Contractor shall develop, analyze, and document a detailed review of the RAS, remote terminals, and communications system test requirements in accordance with the Specification test verification matrix and EIA-632. The Contractor shall prepare the TRR data package in accordance with Appendix B and submit 10 days prior to the factory TRR.

3.4.3.1 Factory TRR Location. The Contractor shall conduct the TRR at the Contractor's facility or at a mutually acceptable facility.

3.4.3.2 Factory TRR Documentation Requirements. The Contractor shall prepare the following documentation as a part of the factory TRR data package and submit at the factory TRR:

a. Final factory test plan and schedules;
b. Final factory test methodology to support test verification matrix and show the methodology to be applied to each requirement;

c. Preliminary Radar Operator's manual;
d. Final test procedures, including component and system test procedures and Certificates of Compliance;
e. Engineering documents, system characteristics documents, test methods, and other technical documents produced or updated since the CDR;
f. Engineering design and analyses reports produced or updated since the CDR; and
g. Test equipment calibration certifications.

3.4.4 Factory Component Testing. The Contractor shall perform factory component testing to verify that all component level requirements of the test matrix have been met. The Contractor shall provide Certificates of Compliance (CofC) to certify that a component (assembly and subassembly) is in compliance with Specification requirements when it is impractical to perform factory test of the item. CofC also includes requirements for environmental certification of electronic and mechanical components.

3.4.5 Factory System Testing. The Contractor shall perform factory system testing to test the Doppler weather radar system as a complete system. The Contractor shall perform tests in the factory of the complete integrated hardware and software system, including all functional areas, system requirements, system controls, and interfaces. The Contractor shall perform and demonstrate system and subsystem level fault detection and perform a 24 hour stability demonstration to the Government.

3.4.6 Factory Test Procedures. Detailed factory test procedures shall be sufficient to verify all specified performance characteristics and functions of the RAS, remote terminals, and communications system. The Contractor shall prepare preliminary factory test procedures for each component and system test to be performed and submit 30 days after the CDR. Final factory test procedures shall be provided at the factory TRR.

3.4.7 Product Configuration Baseline (PCB). The Contractor shall establish the product configuration baseline at the successful completion of the Radar System Acceptance Test. Upon establishment of the PCB, the Contractor shall provide for formal configuration control of all hardware, documentation, support equipment, and spares.

3.4.8 Product Baseline Audit. The Contractor shall conduct a product configuration audit immediately after setting the PCB. The audit shall be conducted using the Radar System and Site Drawings and associated lists identifying the equipment configuration of the PCB.

3.5 Radar Facilities. The Contractor or his subcontractors shall possess the required licenses and bonds to perform the radar facilities site construction and installation work. The Contractor shall perform all of the radar facilities work necessary to install Doppler weather radar system at the Government site:

a. Facility manufacture and QA;
b. Site planning and design;
c. Site preparation;
d. Radar system delivery, installation, and checkout; and
e. Radar system acceptance.

3.5.1 Facilities Manufacturing and Quality Assurance. The Contractor shall provide all hardware, software, manufacturing, and assemble in the factory necessary to produce radar facilities that meets Specification performance and test requirements, and are safe to operate and maintain. The Contractor shall perform the manufacturing using quality control methods, procedures, and techniques, and shall maintain a quality control system in accordance with a documented and industry certified quality assurance (QA) program. The Contractor shall perform the necessary QA tests and inspections to support the procurement of vendor parts and components, and the manufacture of equipment.

3.5.2 Site Planning and Design. The Contractor shall develop site requirements, plans, drawings, and test documentation to prepare the operational site and permanently install the Doppler weather radar system. The Government will make the site and land available for the radar acquisition system installation.

3.5.2.1 Site Preparation Requirements and Installation Plan (SPRIP). The Contractor shall prepare a site preparation requirements and installation plan (SPRIP) for each

site, in accordance with Appendices K and L. Based upon the site plan, the Contractor shall obtain all permits, certifications, releases, bonds, and material prior to receipt of a Notice to Proceed from the Contracting Officer.

3.5.2.2 Site Drawings. The Contractor shall design the installation and prepare site drawings for the operational site. The Contractor shall prepare and maintain the site drawings in accordance with ASME Y14.24M, ASME Y14.34M, ASME Y14.35M, and ASME Y14.100M. The Contractor shall submit site drawings with the SPRIPs in accordance with Appendices K and L.

3.5.2.3 Site Plans and Drawing Certification. A certified and licensed professional engineer shall review and approve all Contractor site plans and drawings.

3.5.2.4 Site Preparation Test Procedures and Reports. Site preparation test procedures shall be sufficient to verify all requirements for the site. The Contractor shall prepare preliminary test procedures for each test to be performed and submit 30 days after the CDR. Final site test procedures shall be provided with the SPRIP.

3.5.2.5 Government Approval. Site plans, drawings, and test procedures shall be reviewed and approved by the Government prior to the Contractor performing any site construction or installation work.

3.5.2.6 Site Preparation Status Reporting. The Contractor shall report site preparation status as a part of the PMRs.

3.5.3 Site Preparation Notice To Proceed. Following Government approval of site plans, drawings, and test procedures, the Contractor shall initiate the following site preparation work only after receiving a Notice to Proceed in writing from the Contracting Officer.

3.5.4 Site Preparation Work. The Contractor shall perform all site preparation work in accordance with Government approved site plans, drawings, and test procedures, and approval does not relieve the Contractor of meeting Specification requirements.

3.5.4.1 Site Surveys. The Contractor shall perform a complete site survey within 60 DAC. The Contractor shall furnish all necessary surveying services, including line and grade surveying. All surveys shall be subject to verification by the Government. The results of each survey shall be submitted to the Government within 30 days after the survey is complete.

3.5.4.2 Site Preparation Equipment and Materials. The Contractor shall provide and deliver all construction equipment, materials, and shelters necessary for the installation of the Doppler weather radar system. This equipment and materials shall include, but is not limited to, earth moving equipment, dollies, cranes, fork-lifts, welding equipment/materials, and tools.

3.5.4.3 Site Modification. The total modification of the site required for installation of the radar acquisition system shall be the responsibility of the Contractor, including extending utilities, permanent access roads, grading, and landscaping. Utility electric power disconnect and distribution panels shall be provided by the Contractor. Conduit, conduit bodies, wiring, and all connecting hardware required for the installation and operation of the radar shall be provided by the Contractor. The work shall include all cable and connecting equipment necessary to interconnect the radar acquisition system with the Government provided communication lines, utilities, and other interfacing systems.

3.5.4.4 Site Improvements. The Contractor shall be responsible for providing any site improvements in accordance with the local code and the governing authorities necessary to accomplish the radar installation.

3.5.4.5 Foundations. The Contractor shall provide permanent foundations necessary for all installations, including the radar tower, shelters, fences, utilities, etc.

3.5.4.6 Power Improvements. The Contractor shall be responsible for providing any power improvements necessary to accomplish the Doppler weather radar system installation in accordance with the National Electric Code and local requirements. The Contractor shall also be responsible for providing a back-up auxiliary power source to keep the radar acquisition system installation operational for a period of 168 hours in the event of commercial power failure. The Contractor shall be responsible for providing all necessary and continuous power regulation and power conditioning to the radar acquisition system and radar equipment to ensure a seamless transfer of power when utility power is interrupted without affect to system operations.

3.5.4.7 Protective Fence. The Contractor shall provide a protective fence around the complete radar acquisition system site enclosing all equipment, including a secure locking device for the entranceway. The Contractor shall provide all the materials and equipment required for the construction and installation of the fence in accordance with the Specification, Appendix E, and local building and electrical codes.

3.5.4.8 Shelters. The Contractor shall fabricate or construct, deliver, and install shelters in accordance with site drawings prior to completion of site preparation.

Shelters shall be provided to protect radar acquisition system equipment in accordance with the Specification and shall include environmental control for equipment.

3.5.4.9 Dewatering. The Contractor shall furnish all labor, materials, tools, and equipment to perform site dewatering. The Contractor shall correct all work necessary for stabilizing of structures or foundation soils required due to any failure of the dewatering system, at no additional cost to the Government. Such correctional work shall be inspected and approved by the Government.

3.5.4.10 Potable Water. There is no Government requirement for potable water on the site.

3.5.4.11 Disposal. The Contractor shall dispose of all excess site materials.

3.5.4.12 Liability. The Contractor shall be responsible for any injury to persons or damage to property resulting from dewatering, site preparation, or installation work.

3.5.5 Site Coordination. The Contractor shall coordinate with local and state authorizing agencies prior to work requiring inspection or approval. The Contractor shall prepare, maintain, and submit a schedule for site work. The site preparation schedule shall identify hold points where an inspection is required prior to proceeding to the next step. In addition, the COTR shall be notified via electronic mail at least 3 days prior to each hold point to determine whether to be present during the inspection. The site schedule shall be submitted as a part of each PMR.

3.5.6 Site Preparation In-Process Tests and Inspections. The Contractor shall perform all tests and inspections necessary to meet Specification requirements and the reporting requirements of Appendix K. All site preparation tests and inspections shall be identified in the test plan. The Government shall review and approve all tests and inspections.

3.5.7 Installation Notice To Proceed. Prior to installation of the radar tower, radome, and equipment, the Government will inspect the site and issue a Notice to Proceed in writing from the Contracting Officer.

3.5.8 Doppler Weather Radar System Delivery Requirements. The Contractor shall deliver all equipment necessary to meet the requirements of the Specification.

3.5.8.1 Delivery. The Doppler weather radar system shall be delivered and installed within 490 DAC. The Contractor shall safely deliver the RAS (including tower), remote terminals, and communications system.

3.5.8.2 Transportation and Packaging. The Contractor shall be responsible for all transportation and packaging of material and equipment during transportation to the site. The Contractor shall be responsible for the removal of all packaging material from the site at the completion of installation.

3.5.8.3 Packing and Shipping. The Contractor shall pack and ship all equipment and materials, and provide the personnel and services necessary to deliver, off-load, and set into place the complete RAS, remote terminals, and communications system.

3.5.9 Installation and Checkout. The Contractor shall perform installation and checkout of the Doppler weather radar system in accordance with the approved site plans, drawings, and test procedures. The Contractor shall perform installation and checkout to verify all operational functions and capabilities of the radar prior to start of acceptance testing. The Contractor shall make all interface connections between the radar acquisition system, utilities, and other equipment. The Contractor shall report site installation status as a part of each PMR.

3.5.9.1 Radar Acquisition System Site. The Contractor shall install all Doppler weather radar equipment and systems at the Government site prepared by the Contractor, including the tower and communications system.

3.5.9.2 Remote Site. The Contractor shall install equipment and systems in the remote Weather Forecast Office (WFO), including the following:

a. Radar Remote Terminals;
b. WFO Communications System; and
c. Interface to the Government supplied NEXRAD meteorological processor.

3.5.9.3 Operating Permits. The Government will provide a radar acquisition system operating permit, if required, for the site. The Contractor shall obtain all city, county, state, and federal construction, installation, and inspection permits.

3.5.9.4 Protection. The Contractor shall protect the radar acquisition system, including pedestal, antenna, communications lines and equipment, and shelter equipment from lightning and electrical damage. The Contractor shall install an obstruction light, if required, in accordance with FAA Advisory Circular AC 70/7460-1K and local building and electrical codes.

3.5.9.5 Site Grounding. The Contractor shall install and connect the equipment to an earth ground within the fence line. Measurements shall be taken using the fall of potential method.

3.5.9.6 Site Hazards. The radar acquisition system installation shall be compliant in all respects with OSHA Safety and Health Standards (29 CFR 1910) and with IEEE STD C95.1, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. In addition, the following guidelines of MIL-HDBK-454 shall be satisfied:

a. Guideline 1 - Safety Design Criteria, Personnel Hazards;
b. Guideline 3 - Flammability; and
c. Guideline 45 - Corona and Electrical breakdown Prevention.

3.5.9.7 Site Security. The Contractor shall provide a site security monitoring and reporting system. Intrusion detection shall be provided for the tower and its entrances, shelters and entrances, and fence entrance(s), including separate security locks to the tower and dome. The Contractor shall provide fire detection and warning for the interior of all shelters and for the interior of the radome.

3.5.9.8 Safety and Emergency Equipment. The Government does not plan to station permanent staff on-site at the site. The Contractor shall provide safety and emergency equipment required for personnel visiting the site for work, including a safety board, one-use eye wash, and climbing harnesses.

3.5.9.9 Communication Lines. The Government will furnish the communication lines and service to provide for the transmission of radar data, operations and control data, fire detection and warning, and site security monitoring and reporting between the RAS site démarcation point and the WFO communications cabinet. The Contractor shall provide and perform all communications system installations and test verifications.

3.5.9.10 Operating Frequency. The Government will provide the frequency authorization to operate the radar acquisition system.

3.5.9.11 Repair of Grounds. Once the radar installation is complete, the grounds and property shall be presented in an acceptable condition including removal of ruts and gouges on access roads.

3.5.10 Acceptance Test Readiness Review (TRR). The Contractor shall develop, analyze, and document a detailed review of the Acceptance Test requirements in accordance with the Specification test verification matrix and EIA-632. Detailed test procedures shall be sufficient to verify all specified characteristics and functions of the Doppler weather radar system. The Contractor shall prepare the TRR data package in accordance with Appendix B and submit 10 days prior to the Acceptance TRR.

3.5.10.1 Acceptance TRR Location. The Contractor shall conduct the Acceptance TRR at the radar site or at a mutually acceptable facility.

3.5.10.2 Acceptance TRR Documentation Requirements. The Contractor shall prepare the following documentation as part of the Acceptance TRR data package and submit at the Acceptance TRR:

a. Final acceptance test plan and schedules;
b. Final acceptance test verification matrix, including coverage and test methodology to be applied to each requirement;
c. Draft final Radar Operator's Manual;
d. Final acceptance test procedures (New test procedures, updated factory system test procedures, and other documents for use in the on-site acceptance testing);
e. Radar System and Site Drawings; and
f. Test equipment calibration certifications.

3.5.11 On-Site Acceptance Testing. After completion of the radar installation and checkout, acceptance testing shall be performed by the Contractor to demonstrate to the Government that the radar system meets all Specification requirements. The Contractor shall perform acceptance testing of the complete Doppler weather radar system in accordance with approved procedures. The purpose of acceptance testing is to verify that the Doppler weather radar system meets all Specification and performance requirements in an operational environment. Acceptance testing on the Doppler weather radar system shall be performed by the Contractor, and shall be completed within 510 DAC.

3.5.11.1 Acceptance Test Process. The Contractor shall verify all of the Specification system requirements in the test verification matrix. In addition, the Contractor shall perform an on-site stability test and final acceptance test. New test documentation shall be prepared and factory test documentation shall be updated to reflect the on-site environment. In support of acceptance testing, the Contractor shall:

a. Certify test equipment and support equipment is calibrated and operating within their required tolerances;
b. Perform acceptance testing using Government approved test plans and procedures. The Contractor shall maintain an official test log and any deviations or exceptions to the approved test procedures shall be noted in the log. A list of any discrepancies revealed by testing shall be furnished to the Government within 48 hours;

c. Provide technically trained test personnel to perform acceptance testing;
d. Analyze test results;
e. Correct deficiencies discovered during test and validate the corrections by re-testing; and
f. Provide test documentation in accordance with Appendices G, H, and I for each test performed.

3.5.11.2 Acceptance Test Documentation. The Contractor shall prepare new procedures or update factory system test procedures. The Contractor shall submit plans, procedures, and other documents for use in the on-site acceptance testing. The Contractor shall prepare test procedures that will verify each system function and requirement listed in the test verification matrix of the Specification. The Contractor shall submit test procedures 60 days prior to the Acceptance TRR. Test verifications shall be performed in accordance with Government approved test procedures. The Contractor shall prepare and submit an acceptance test report within 30 days after completion of acceptance testing. Changes to approved test procedures shall require written approval from the COTR. The Contractor shall provide acceptance test documentation in accordance with Appendices G, H, and I.

3.5.12 Government Acceptance. The Government will accept the complete Doppler weather radar system when it meets all Specification and SOW requirements, and all documentation has been submitted and approved.

3.5.13 As-Built Site Drawings. The Contractor shall update the Contractor's prepared site drawings to reflect the as-built condition of the radar acquisition system site. The Contractor shall submit the as-built site drawings 30 days after radar acquisition system acceptance for the Doppler weather radar system.

3.6 Interface to the NEXRAD Meteorological Processor (NMP). The Contractor shall provide an interface and standard output port to the Government NEXRAD meteorological processor, including all hardware and software. This interface shall provide the Government with radar data (meteorological data) in accordance with the requirements of Appendix A and 3.10 of the Specification.

3.6.1 Manufacturing and Quality Assurance. The Contractor shall provide all hardware, software, and assembly necessary to produce an interface that meets Specification performance and test requirements. The Contractor shall develop, verify, and document the software for the Doppler weather radar interface to the NEXRAD meteorological processor. The Contractor shall prepare and submit software in accordance with Appendix F. The Contractor shall perform the necessary QA tests and inspections to verify the interface hardware and software.

3.6.2 Factory Interface Test Readiness Review (TRR). The Contractor shall develop, analyze, and document a detailed factory review of the NMP interface test requirements in accordance with the Specification test verification matrix and EIA-632. Detailed factory test procedures shall be sufficient to verify all specified characteristics and functions of the NMP interface. The Contractor shall prepare the interface TRR data package in accordance with Appendix B. The Contractor shall submit the data package 10 days prior to the NMP interface TRR.

3.6.2.1 Interface TRR Location. The Contractor shall conduct the NMP interface TRR at the Contractor's facility or at a mutually acceptable facility.

3.6.2.2 Interface TRR Documentation Requirements. The Contractor shall prepare the following documentation as a part of the factory NMP interface TRR data package and submit at the factory interface TRR:

a. Final factory interface test plan and schedules;
b. Final interface test requirements matrix to show the coverage and test methodology to be applied to each requirement;
c. Preliminary NMP interface change pages to the Radar Operator's Manual;
d. Final test procedures; and
e. Interface related engineering documents.

3.6.3 Factory Interface Tests. The Contractor shall perform NMP interface tests to demonstrate the interface meets requirements of Appendix A of the Specification prior to delivery and test on-site. The Contractor shall provide all factory test facilities. The Contractor shall notify the Government, in writing, 15 days prior to NMP factory tests performed by the Contractor. The Government shall be notified of any change to a NMP interface test schedule within 24 hours of a change being identified.

3.6.3.1 Government Witness. The Government shall have the option to provide a representative to witness the Contractor’s NMP factory interface tests, installation and checkout, and on-site acceptance testing.

3.6.3.2 Interface Test Procedures. The Contractor shall prepare preliminary factory NMP interface test procedures for each function to be tested, and submit 60 days prior to interface TRR. Final test procedures shall be provided at the factory NMP interface TRR.

3.6.4 Product Configuration Baseline. The Contractor shall revise the PCB with the NMP interface. The Contractor shall set and publish the revised PCB no more than 20 days after successful completion of on-site acceptance tests of the NMP interface.

3.6.5 Interface Software. The Contractor shall publish a Software Version Description for the NMP interface and update the System Software Product Baseline. The software documentation shall be prepared in accordance with Appendix F and delivered 30 days after successful completion of on-site acceptance testing of the NMP interface.

3.6.6 On-Site Interface Installation and Acceptance Tests. The Contractor shall perform on-site NMP interface installation and acceptance tests to demonstrate the interface meets the requirements of Appendix A of the Specification. The Contractor shall notify the Government, in writing, 15 days prior to the start of on-site acceptance tests performed by the Contractor. The Government shall be notified of any change to the on-site test schedule within 24 hours of a change being identified.

3.7 Maintenance. After acceptance, the Contractor shall be responsible for all operational support, maintenance, and repair to ensure the Doppler weather radar system and RAS facilities will continue to be operational and available. The Contractor shall provide all parts and supplies, materials, and services necessary to operate the Doppler weather radar system and RAS facilities throughout the term of the contract. The Contractor shall use the Government spares for maintenance and repair work. The Contractor shall repair or replace all spares used. The Contractor shall be responsible for providing all operational support services and consumables, except the following, which shall be Government supplied: electrical utility power, communication lines, and any fuels required for the auxiliary and conditioning power sources. The Government shall not be responsible for the loss of Contractor supplies or materials stored on site.

3.7.1 Operating and Maintenance Services. The Contractor shall furnish all labor, tools, test equipment, software, facilities, material, shipping, travel, and any other technical or administrative support necessary to maintain and repair the Doppler weather radar system and RAS facilities. Operating and Maintenance service shall be available on a 24 hour per day, 7 days a week basis. The response time to have a technician at the radar site for maintenance and repair shall be three (3) hours or less from the time the Government notifies the Contractor of a failure.

3.7.2 Test Equipment. The Contractor shall provide the test equipment and fixtures necessary for performing all maintenance and repair tasks. The Contractor shall provide test equipment which is calibrated to manufacturer's recommended standards and interval.

3.7.3 Preventive Maintenance. The Contractor shall be responsible for the performance of all required and recommended preventive maintenance. All preventive

maintenance shall be coordinated with and approved by the Meteorologist-in-Charge (MIC) at the local WFO prior to removing the radar from service. The Contractor shall provide a completed Radar Performance Data Sheet to record radar reference parameters after preventive or corrective maintenance actions.

3.7.4 Configuration Changes. Any repair or modification which changes the approved configuration baseline shall be submitted to the Government for approval by the COTR prior to installation. Changes to the Radar Operator's Manual shall be delivered at the time of installation of the modification or repair.

3.7.5 Software Changes. Any modification to the software which changes the software configuration shall be submitted the Government for approval by the COTR prior to installation of the modification. Changes to the Radar Operator's Manual shall be delivered at the time of installation of the modification.

3.7.6 Interface Maintenance. Any modification to the NMP interface software which changes the software configuration shall be submitted the the Government for approval by the COTR prior to installation of the modification. Changes to the Radar Operator's Manual shall be delivered at the time of installation of the modification.

3.7.7 Maintenance Plan. The Contractor shall prepare and submit a maintenance plan that describes in specific terms how the Contractor will maintain the Doppler weather radar system and ensure the radar continues to meet the Specification requirements. The maintenance plan shall be updated and maintained current at all times.

3.8 Deliver Spares. The Contractor shall deliver all radar spare parts selected from the recommended list prepared by the Contractor and approved by the Government. The Contractor shall prepare a list of spares required to support the Doppler weather radar system and site for seven (7) years.

3.8.1 Vendor Warranty Repair. The Contractor shall use the standard vendor warranties that are provided with the equipment. The Contractor shall ensure these warranties are honored by vendors. Vendors shall repair or replace all items that fail within the warranty period at no cost to the Contractor or the Government. The vendors shall either travel to the operational site to perform repair work or repair the item in the vendor maintenance facility.

3.9 Training. The Contractor shall provide Radar Operator's training in accordance with Appendix M, to enable the WFO technical staff to operate the installed radar. Training shall be based on the Radar Operator's Manual and Contractor supplied training materials.

3.9.1 Radar Operator's Course Requirements. The Contractor shall prepare a Radar Operator's training course for Government radar operators. The following course shall be developed in the Contractor's format in accordance with MIL-PRF-29612. The radar operator's training shall provide Government operators with sufficient familiarization with the radar to perform successful operations and control of the radar. Radar Operator's training shall use a hands-on approach to instructions. Graduates of the radar operator's course shall be able to:

a. Understand the radar concept of operations;
b. Initialize the radar;
c. Perform radar pre-operational preparation;
d. Make use of the Radar Operator's Manual;
e. Monitor performance and operations of radar;
f. Control the radar;
g. Isolate a system fault to initiate a maintenance request; and
h. Contact the Contractor's maintenance organization.

3.9.2 Training Courses. Contractor-provided classes shall not be held on any weekend or Government observed holiday.

3.9.3 Operator's Course Classes. The Contractor shall conduct Radar Operator's training courses at a Government-provided facility. A cadre of no more than eight students will attend each class ordered.

3.9.4 Training Material. Training material for each course shall include a trainee course guide and visual aids. The Contractor shall provide all course materials for classes. Materials used during the class will be retained by the student upon completion of each class. The Contractor shall provide a certificate of training to each class graduate and a class roster to the Government at the end of each class. The Government shall be allowed to video tape each training course conducted. The Contractor shall provide access and accommodation for Government personnel during the taping.

3.9.5 Radar Operator's Training Material Delivery. The Contractor shall deliver the preliminary Radar Operator's training material 90 calender days after exercise of a delivery order. The Government shall have 60 calender days to review and comment on the draft training course material. The Contractor shall incorporate Government comments and deliver the final Radar Operator's training material 30 calender days after receipt of Government comments.

3.10 Radar Engineering and Technical Services. The Contractor shall provide technical services to the Government throughout the term of this contract. These services will be procured on a delivery order basis. The Contractor shall provide a variety of engineering services.

3.10.1 Site Relocations and Additions. The Contractor shall maintain the capability to relocate a Doppler weather radar system when deemed necessary by the Government. This relocation may be on the existing property or to a new location. The installation shall comply with approved site preparation and installation requirements and plans. The Contractor shall be responsible for performing any necessary site surveys. New installations shall comply with all requirements of the Statement of Work and the Specification.

3.10.2 Modifications. The Contractor shall provide engineering services to develop, manufacture, test, install, and document hardware or software modifications to the radar system, as required. Such modifications shall be undertaken upon issue of a delivery order from the Government. All modifications shall be developed and documented, adequately verified, and approved by the Government before they are installed in the operational system. After Government approval, a modification kit shall be provided including all items of hardware or software (including firmware) items required for accomplishing the change.

3.10.3 Facility Services. The Contractor shall provide facilities engineering services in support of the radar system, as required. Such services may include planning, designing or redesigning, and completing work items related to structures, supports, utilities, cabling, lightning protection, grounding, or alternative power sources. Such services shall be performed as required by the Government delivery order.

3.10.4 Special Studies. The Contractor shall perform special engineering studies as directed by the Government. Such studies may cover engineering issues affecting the radar system, fault analyses of hardware, interference problems, and deficiencies in diagnostic software, as examples. The scope and objective of specific studies shall be identified by the Government as tasked in the delivery order.

APPENDIX A
PROGRAM MANAGEMENT REVIEW (PMR) DOCUMENTS

A.1.0 PMR Content. Each review shall provide a program overview and detailed discussion of selected management areas and issues, with up to 12 Government representatives in attendance. The review shall provide the Government and Contractor management with sufficient information to independently determine the status of the Contractor's technical progress, program planning, and management approach. Status and information presented at the review shall reflect information not more than seven days old. Discussions may be conducted as one group or in several groups organized by Contractor defined category.

A.2.0 PMR Topics. The following topics shall be discussed at each PMR along with other topics proposed by the Contractor or the Government. The PMR shall address technical issues and specific events and issues of concern within the requirement categories defined in 3.1.

A.2.1 Program Management Status. The Contractor shall provide program management status, issues, and problems including:

a. Contract work breakdown structure (CWBS);
b. Management, contract, and risk;
c. Progress tracking and reporting of milestones and schedules;
d. Subcontractor and Contractor performance and subcontractor management; and
e. Recommended corrective actions to reported problems.

A.2.2 Performance Status. For the requirement categories defined in 3.1, the Contractor shall provide performance status, issues, and problems including:

a. Engineering, design, and manufacture;
b. Reliability, maintainability, availability, and maintenance planning;
c. Construction, delivery, and installation;
d. Test verification;
e. Technical risk; and
f. Recommended corrective actions to reported problems.

A.2.3 Supporting Categories. For the supporting categories, the Contractor shall provide support status, issues, and problems including:

a. Supply support, training, and spare parts;
b. Radar Operator's Manual and system drawings;
c. Configuration management; and
d. Recommended corrective actions to reported problems.

APPENDIX B
ENGINEERING REVIEW DOCUMENTATION

B.1.0 Documentation Requirements. The Contractor shall present engineering design data, performance analyses, and test results to the Government to document the recommended system. All documentation shall address technical issues and specific events and issues of concern within each of the requirement categories defined in 3.1. The Contractor shall develop the following documentation for the PDR, CDR, TRR, and TIMs:

a. Technical characteristics;
b. Performance characteristics;
c. Software characteristics;
d. Internal and external interfaces;
e. Requirements and test methods matrix; and
f. Technical documentation.

B.2.0 Additional Instructions. The following additional instructions apply to the PDR, CDR, TRR, and TIMs:

a. Presentations shall be conducted by Contractor personnel. The Government reserves the right to revise the agenda and/or make presentations;
b. The actual review date shall be established by mutual agreement ten days prior to holding the review. The location of the reviews may be changed by mutual agreement; and
c. Response to all Contractor action items by either closure or a plan for closure shall be made within ten days after each review. An action item is not closed until written Government approval is given.

B.3.0 Additional PDR Requirements. Contractor format is acceptable for the PDR data package. The PDR data package shall include the following information sufficient to confirm that the engineering analyses, design concepts, and design approach will:

a. Establish the basic design and preliminary engineering approach for the Doppler weather radar system;
b. Identify and describe the critical system, subsystem, and component problems and risks. Identify and describe design, manufacturing, and performance problems and risks; and
c. Satisfy each Specification requirement.

B.3.1 Preliminary Design Data. Provide preliminary design data to validate the Government Specification requirements including:

a. Description of design approach for the Doppler weather radar system;
b. System sketches, preliminary drawings, and schematic diagrams;
c. Electrical and mechanical design concepts, preliminary sketches and drawings, and schematic diagrams; and
d. Product descriptions and characteristics.

B.3.2 Interface Design Data. Provide preliminary interface documents, interface drawings, and supporting engineering data to define and verify external and internal interfaces.

B.3.3 Engineering Analyses Data. Provide systems engineering requirements analyses data to verify engineering decisions. Include sufficient engineering data to demonstrate achievement of Specification requirements, and provide documentation describing preliminary engineering analyses of:

a. Engineering approach for the system;
b. Engineering Specification and requirements review;
c. Preliminary mechanical engineering design, studies, and computer program results;
d. Preliminary electrical/electronic engineering design, studies, and computer program results; and
e. Maintenance and support review, including spares, and test and support equipment.

B.3.4 Support for Design Approach. Provide existing products historical test results and supporting documentation. Provide results of analyses and evaluation of data, including documentation of performance, failures, reliability, maintainability, and maintenance and support costs.

B.4.0 Additional CDR Requirements. Contractor format is acceptable. The CDR data package shall provide the following information in sufficient detail to confirm that the detailed engineering analyses, system design, mechanical and structural analyses, and manufacture approach will:

a. Demonstrate that the detailed design and engineering approach for the Doppler weather radar system is complete;
b. Demonstrate that all critical system design, subsystem design, manufacturing, and performance problems and risks have been resolved;
c. Satisfy each Specification requirement; and
d. Ensure the total Doppler weather radar system is ready for manufacture.

B.4.1 Issues Data. Provide engineering, design, procurement, and manufacturing data sufficient to identify resolution of critical issues identified during or subsequent to the PDR.

B.4.2 Specification test verification matrix requirements. Provide detailed system, subsystem, and component compliance data.

B.4.3 Detailed Design Data. Provide detailed design data to validate the projected product configuration baseline including:

a. Description of detailed design approach for the Doppler weather radar system;
b. System detailed drawings and schematic diagrams;
c. Electrical and mechanical detailed design drawings and schematic diagrams;
d. Contractor equipment drawings; and
e. Site drawings and installation plans.

B.4.3.1 Baselines. Define and describe the projected product baseline.

B.4.3.2 Interface Design Data. Provide detailed interface documents, interface drawings, and supporting engineering data to define and verify external and internal interfaces.

B.4.3.3 Engineering Analyses Data. Provide systems engineering requirements analyses data to verify engineering decisions. Include sufficient engineering data to demonstrate achievement of Specification requirements, and provide documents describing final detailed engineering analyses of:

a. Final engineering design for the system;
b. Mechanical engineering design, studies, and computer program results;
c. Final electrical/electronic engineering design, studies, and computer program results;
d. Safety, Electromagnetic Compatibility, and Electromagnetic Interference of integrated equipment;
e. Security;
f. Environmental impact; and
g. Maintenance and support review, including spares, training, and technical data.

B.4.4 Support for Design Approach. Provide update of existing products historical results, and supporting documentation. Provide results of analyses and evaluation of data, including documentation of performance, failures, reliability, maintainability, and support costs.

B.4.5 Producibility. Provide documentation of manufacture design and analyses, including:

a. Producibility requirements;
b. Manufacturing plans and processes;
c. Tools and test equipment;
d. Assembly procedures; and
e. Implementation of quality assurance and configuration management procedures.

APPENDIX C
ENGINEERING DESIGN AND ANALYSIS REPORTS

C.1.0 General. An analysis report shall document the results and findings of any engineering designs, analyses, assessment(s), studies, investigations, or as tasked by the Government.

C.2.0 Cover and Title Page. The following information shall appear on the outside front cover and on the title page:

a. Report title, report number, and report date;
b. Contractor's name, technical point of contact, and commercial entity code; and
c. Specification and/or Statement of Work reference.

C.3.0 Purpose. The Contractor shall identify the purpose of the analysis. The Contractor shall identify the analysis requirements and correlate them to specific requirements in the Specification(s) and/or Statement of Work.

C.4.0 Analysis Methods and Procedures. The Contractor shall describe the methods and procedures used in conducting the analysis, including but not limited to the specific step-by-step procedural sequence, derivation, or analysis process.

C.4.1 Results. All results shall be presented, as follows:

a. An analysis of results and findings; and
b. Supporting calculations, mathematical computations, formulas, equations, algorithms, and computer printouts.

C.4.2 Conclusions and Recommendations. Conclusions and recommendations shall be provided and shall include:

a. Discussion of all results or product;
b. The need for any additional or alternative analyses;
c. Recommendations; and
d. Documentation changes required or necessary.

C.5.0 Appendices. Appendices shall be used to present detailed analyses data, drawings, computer printouts, photographs, or other documentation that may be too voluminous to include in the main body of the report.

APPENDIX D
RADAR OPERATOR'S MANUAL

D.1.0 General. The Contractor shall provide an radar operator's manual to the Government. The radar operator's manual shall describe the operation, control, and fault isolation of the radar and components. The Radar Operator's Manual shall be used by WFO meteorologists to control the Doppler weather radar and to create and display weather radar products.

D.2.0 Manual Versions. The Contractor shall provide a preliminary, draft final, and final version of the operator's manual.

D.3.0 Radar Operator's Manual Content. Manual chapters or sections shall include step-by-step procedures for:

a. Introduction and theory of operations;
b. Use of the operator's manual, drawings, procedures, and other documents in performing operations;
c. Operation of auxiliary power system, uninterruptable power source, and commercial (utility) power switching;
d. Initializing and operating the radar;
e. Initializing and operating communication interfaces, including radar to communication system, radar remote terminals, and NEXRAD meteorological display terminal;
f. Initializing and operating fire detection and warning, and site security, monitoring, and reporting equipment;
g. Display and analyses interpretation;
h. Workstation commands for radar operations and displays;
i. Adjusting radar parameters;
j. Remote terminal equipment adjustments;
k. Monitoring and verifying radar performance;
l. Calibration tests;
m. Self Diagnostics on start-up and workstation commands for the radar;
n. Isolate a system fault to initiate a maintenance request;
o. Loss of Communication Link - Procedures for reestablishing loss of radar data;
p. Communication Diagnostics - Procedures to include diagnostics between the radar system, communications system, and Government communication lines;
q. Repair call-in procedure;
r. Terminating operations;
s. Stowing the antenna;

t. Re-start, power-up, and alignment after repair;
u. Data recovery;
v. Operating and calibration checks; and
w. Radar safety equipment.

D.4.0 Radar Operator's Manual Validation. The Contractor shall review, inspect and verify the technical accuracy of the operator's manual. The Government reserves the right to witness the validation. Validation entails the actual performance by Contractor personnel of all procedures in the manual. The Government witness may require that the Contractor stop validation or change/revise and/or repeat validation steps if the Government witness determines the Contractor validation procedure is not adequate to substantiate the accuracy of the radar operator's manual.

D.5.0 Delivery of Radar Operator's Manual. The following quantity of copies of the preliminary Radar Operator's Manual are required to be delivered to the Government: one (1) paper copy to the Contracting Officer; six (6) paper copies and one (1) disk copy to W/OSO31; six (6) paper copies to W/OSO43, and five (5) paper copies to W/CR. The following quantity of copies of the draft final and final Radar Operator's Manual are required to be delivered to the Government: one (1) paper copy to the Contracting Officer; six (6) paper copies and one (1) disk copy to W/OSO31; six (6) paper copies to W/OSO43, and five (5) paper copies to W/CR. The disk copy shall be IBM-PC-compatible 3.5 inch high-density computer disk in a mutually acceptable software application format. All paper documents shall be submitted on 8½ x 11 paper with foldouts in a 12 point font for text and 10 or 12 point font for tabular data. The Government shall have right to reproduce the Radar Operator's Manual for Government use on this program.

APPENDIX E
RADAR SYSTEM DRAWINGS

E.1.0 General. The Contractor shall prepare and submit system drawings and associated lists for the radar system, including the radar acquisition system, remote terminals, communications system, and the radar interface.

E.2.0 Drawings. The Contractor shall develop drawings and associated lists in accordance with ASME Y14.24M, ASME Y14.34M, ASME Y14.35M, and ASME Y14.100M. The following drawings and associated lists shall be prepared:

a. Radar System, Subsystem, and Component Level Arrangement Drawings. The Contractor shall provide drawings and associated lists for the arrangement of components and subsystems into the radar system, including interconnecting diagrams;

b. Installation Drawings. The Contractor shall provide installation drawings and associated lists for the radar system, including mounting, mating, and interfaces;

c. Electrical/Electronic Drawings. The Contractor shall provide electrical/electronic drawings and associated lists for the radar system, including interconnecting diagrams, wiring diagrams, and wiring lists for interfaces between subsystems;

d. Interface to NEXRAD meteorological processor. The Contractor shall provide interface control drawings and associated lists for the interface hardware and software; and

e. Drawing Index. The Contractor shall prepare and maintain an index of all system drawings, lists, and documents for the Doppler weather radar system. The index shall include the drawing number, title, applicable revision letter/number, modification number, and date of each drawing.

E.3.0 Drawing Electronic Media. All drawings for this program shall be delivered in electronic media compatible with AUTOCAD®, release 14 or higher. If drawings are available in a digital file but were not developed under this contract, a digital file in native computer aided drawing format is acceptable and shall be provided.

APPENDIX F
SOFTWARE MEDIA AND DOCUMENTATION

F.1.0 Scope. This appendix defines the media, content, and format requirements for radar software/firmware to be provided in accordance with the SOW.

F.2.0 Software Version Description(SVD). The SVD shall be prepared in accordance with the following instructions for media, format, and content.

F.2.1 Cover and Title Page.

F.2.2 Overview. This section shall briefly state the purpose of the software. The overview shall describe the general nature of the software; summarize the history of software development and operation; and list other relevant documents.

F.2.3 Referenced Documents. This section shall list the number, title, revision, and date of all documents referenced in the SVD.

F.2.4 Version Description. This section shall be divided into the following paragraphs.

F.2.4.1 Inventory of Software Contents. This paragraph shall list by identifying numbers, titles, abbreviations, dates, version numbers, and release numbers, as applicable, all computer files that make up the software.

F.2.4.2 Software Media. The Contractor shall deliver two master digital copies of all operational and maintenance software on media, consistent with the installed equipment. Cd-roms and programmable chip devices shall be packaged to protect loss of data during transportation, storage, and installation.

F.2.4.3 Changes Installed. This paragraph shall contain a list of all changes incorporated into the software version since the System Software Product Baseline. This paragraph shall identify problem reports, change requests, and variances associated with each change and the effects, if any, of each change on system operation, and on interfaces with other hardware and software.

F.2.4.4 Installation Instructions. This paragraph shall provide or reference the following information:

a. Instructions for installing the software version;
b. Identification of other changes that have to be installed for this version to be used, including site-unique adaptation data not included in the software version;

c. Procedures for determining whether the version has been installed properly; and
d. A point of contact to be consulted if there are problems or questions with the installation.

F.2.4.5 Possible Problems and Known Errors. This paragraph shall identify any possible problems or known errors with the software version at the time of release, any steps being taken to resolve the problems or errors, and instructions (either directly or by reference) for recognizing, avoiding, correcting, or otherwise handling each one. The information presented shall be appropriate to the intended recipient of the SVD.

F.2.5 Notes. This section shall contain any general information that aids in understanding this document.

F.2.6 Appendices. Appendices may be used to provide information published separately, for convenience (e.g., charts, graphs). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided.

F.3.0 Changes to the Radar Operator's Manual. When the System Software Product Baseline is set, all operator procedures in the Radar Operator's Manual shall be updated as necessary to the Doppler weather radar system acceptance baseline. When changes are made to the software, the Software Version Description shall include change pages as necessary to the Radar Operator's Manual. The change pages shall be delivered in the same format required by Appendix D.

APPENDIX G
TEST AND DEMONSTRATION PROCEDURES

G.1.0 General. A test and demonstration procedure shall provide: (a) scope and purpose of the test or demonstration; (b) the test or demonstration philosophy; (c) a description of test equipment and facilities used; (d) detailed step-by-step procedures; and (e) Radar Performance Data Sheets. Each test procedure shall contain the following information, as applicable.

G.2.0 Cover and Title Page. The Cover/Title page shall contain the following:

a. Date of issue (and revision date, if applicable);
b. Test procedure descriptive title and number;
c. Contractor name, commercial entity code, and technical point of contact;
d. Spaces for certification that the complete procedure has been validated, including spaces for the validator's name, title, signature, and date;
e. Spaces for name, title, signature, and date of Government authority approving the procedure and any subsequent changes;
f. Revision block for subsequent change(s); and
g. Disclosure notice.

G.3.0 Scope and Purpose. Address the scope and purpose of the procedure, description of test or demonstration, test and demonstration philosophy, proposed data to be taken, and the success criteria.

G.4.0 Step-by-Step Procedures. Each procedure shall contain step-by-step instructions.

G.4.1 Requirements. Identify the performance requirements, acceptance limits, and accuracy limits. Include reference to radar Specification paragraph numbers.

G.4.2 Criteria for Test Verification. Identify the quantity of equipment or data samples required; number of test verifications required; duration of each test; and a quantitative definition of success and failure from the total number verified.

G.4.3 Test or Demonstration Set-Up. The test or demonstration set-up shall include:

a. Diagram of test setup showing interconnections between test equipment and items under testing;
b. Step-by-step procedures to set-up, test, and demonstrate all required functions;
c. Test item operating limits and test conditions to be imposed;

d. Instrumentation points; and
e. Caution and protective safety warnings.

G.4.4 Test and Demonstration Measurements. The Contractor shall provide:

a. Step-by-step operations to perform test verifications and obtain required demonstration results; and
b. Required performance parameters and values to be measured.

G.4.5 Reference Documents. Identify other documents or conversion tables required for all test or demonstration data.

G.5.0 Test and Reference Equipment. For each test or demonstration, the Contractor shall identify all required test equipment, as detailed below in G.5.1 through G.5.3, inclusive.

G.5.1 Test and Reference Equipment. The Contractor shall:

a. List required test and reference equipment by nomenclature, model number, part number, name of manufacturer, and accessories;
b. List test and reference equipment settings or scripts; and
c. Define the range and accuracy required.

G.5.2 Automatic Test Equipment (ATE). Test and calibration procedures performed by automatic test equipment (ATE) and/or computer software shall be fully identified as to parameters measured and data taken. A description of the capability of the ATE and how the results are provided, shall also be included.

G.5.3 Software. All software used in test verification shall be documented and such documentation shall include at a minimum: (a) software name; (b) software version number; and (c) date of release.

G.6.0 Radar Performance Data Sheets. Test and demonstration procedures shall include a sample Radar Performance Data Sheet, form, or depiction of some other computer record. Graphic, or computer-generated printouts of individual results shall also be attached to the Radar Performance Data Sheets. The Radar Performance Data Sheets shall provide space for:

a. Name of the test or demonstration;
b. Nomenclature, model numbers, part numbers, and serial numbers of the RAS, remote terminals, and communications system or LRU being verified or demonstrated;
c. Date and time of test or demonstration;
d. Identification of ambient conditions if not part of the test or demonstration conditions;
e. Identification of Specification values for final values or readings for comparison;
f. Record test values, demonstration values, and reference measurements;
g. Final computed values;
h. Supporting measurements, calculation, mathematical computations, formulas, equations, and algorithms;
i. Anomalies, deviations, or discrepancies;
j. Name, title, signature, and date of person conducting test verification;
k. Name, title, signature, and date of NWS witness;
l. Identification of attached test logs, printouts, etc.; and
m. Identification of changes made to the test or demonstration procedure, set-up, test equipment, or predicted outcome.

APPENDIX H
TEST AND DEMONSTRATION REPORTS

H.1.0 General. A test or demonstration report shall document the results, findings, and analyses of test and demonstrations performed by the Contractor. Reports shall enable the Government to evaluate compliance with contract requirements, including Specification and drawings.

H.2.0 Cover and Title Page. The following information shall appear on the outside front cover and on the title page:

a. Report title, including identification of item verified;
b. Contractor's report number;
c. Report date;
d. Contractor's name, commercial entity code, and technical point of contact;
e. Contract number and contract line item number or sequence number;
f. Date or period of test verification; and
g. Disclosure Notice.

H.3.0 Test Results and Analyses.

H.3.1 Completed Radar Performance Data Sheets.

H.3.2 Recorded Data. Attach written, graphic, or computer-generated printouts of results. The actual parameters measured and recorded, instrument readings, plotter graphs, intermediate values, and meteorological values.

H.3.3 Analyses and Conclusions. Include:

a. An analysis of the required test objectives;
b. Identification of test matrix requirements completed;
c. The need for repeat, additional, or alternative test verifications;
d. Issues, resolutions, and recommendations; and
e. Documentation changes required.

H.4.0 Appendices. Appendices shall be used to present detailed test data in hard copy, magnetic, or optical media.

APPENDIX I
EQUIPMENT CALIBRATION AND CERTIFICATION

I.1.0 General. An equipment calibration certification shall contain the following information.

I.2.0 Cover and Title Page. The following information shall appear on the outside front cover and on the title page:

a. Contractor's name, commercial entity code, and technical point of contact;

b. Contract number; and

c. Calibration Certification date.

I.3.0 Calibration Certification Requirement. All test verification, measurement, and facility equipment shall be maintained in accordance with the manufacturer's specifications, calibration requirements, and calibration interval. The Contractor shall list the equipment and the next calibration required date on the certification. Contractor certification of calibration measurements shall be traceable to the National Institute for Standards and Technology (NIST) calibration facility or another calibration facility designated as a national reference facility.

APPENDIX J
CONFIGURATION MANAGEMENT PLAN

J.1.0 Plan Content. The Contractors Configuration Management Plan (CMP) shall contain, but is not limited to, the following configuration management (CM) elements. The outline format or structure may be changed by the Contractor, but each of the following CM elements shall be addressed.

J.1.1 Introduction.
- J.1.1.1 Purpose and scope.
- J.1.1.2 Definitions of configuration management within the company.
- J.1.1.3 Summary of plan features, objectives, and Contractor's approach.
- J.1.1.4 Reference documents - List of specifications, standards, manuals, other documents to include Contractor policy directives referenced in plan.

J.1.2 Organization, Roles, Responsibilities, and Resources.
- J.1.2.1 Relationships and integration of Contractor's project organization and functional organization.
- J.1.2.2 Identification of Contractor's CM organization and responsibilities.

J.1.3 Configuration Management Planning and Management.
- J.1.3.1 Description of configuration milestones and internal audit procedures.

J.1.4 Configuration Data Management. Description of methods for meeting configuration management technical data requirements (hardware and software) for product life cycle.

J.1.5 Configuration Identification. Description of methods for meeting configuration identification requirements.
- J.1.5.1 Specification Identification.
- J.1.5.2 Change Control Form Identification.
- J.1.5.3 Physical Identification Process.
- J.1.5.4 Baselines.
- J.1.5.5 Library and recovery process.
- J.1.5.6 Interface Management.

J.1.6 Configuration Status Accounting. Description of methods to collect, record, process, store, handle, and release status accounting information.
- J.1.6.1 Product configuration status.
- J.1.6.2 Configuration documentation.
- J.1.6.3 Historic baseline.
- J.1.6.4 Change requests.

J.1.6.5 Change proposals.
J.1.6.6 Change notices.
J.1.6.7 Variances.
J.1.6.8 Warranty data/history.
J.1.6.9 Configuration verification and audit status/action items closeout.
J.1.6.10 Modifications.

J.1.7 Configuration Control (Configuration Change Management). Description of methods and procedures for changing baselines.

J.1.8 Configuration Verification and Auditing. Description of methods and number of audits to be performed, when they will be performed, normal course of product flow, CM role in audit, and roles of other organizations in audits. Include internal audits.

APPENDIX K
SITE PREPARATION AND INSTALLATION DOCUMENTATION

K.1.0 General. The following data requirements shall apply to radar facilities site preparation, testing, inspections, delivery, installation, checkout, and acceptance.

K.1.1 Document Formats. The Contractor shall provide documents in the following format:

a. Text. The plan shall be on standard size (8 ½" x 11", except for oversize graphics or tables which may be on 11" x 17") white paper and securely bound. Pages shall be sequentially numbered. All attachments shall be identified and referenced in the text of the plan;
b. Diagrams/Drawings. Shall be in accordance with ASME Y14.24M, ASME Y14.34M, ASME Y14.35M, and ASME Y14.100M;
c. Illustrations/Graphics. Illustrative material (e.g. charts, graphs, photographs, sketches, etc.), shall be in accordance with the Contractor's standard methods for such data; and
d. Format. The plan may be prepared in Contractor's format and shall be legible and suitable for reproduction.

K.1.2 Certificates of Compliance. The Contractor shall furnish Certificates of Compliance (CofC) for site preparation and the completely installed radar system.

K.2.0 Site Preparation Plan. The Contractor shall prepare and submit a site preparation and installation plan to the Government for approval prior to initiation of site construction work. A detailed site preparation, site construction, and installation schedule, with all major milestones indicated, shall be provided to the Government within 300 DAC. The schedule shall be updated, maintained, and provided to the Government monthly.

K.2.1 Site Preparation and Installation Schedule. A schedule containing complete site preparation and installation planning events and tasking activities. Schedules to be structured by day or week:

a. Schedules to identify completed events and activities and changes or slippages to events/activities;
b. Events to identify constraints and interdependency with other events on the planning schedule (as well as interfacing events of the site schedule); and
c. A detailed procedure for the packaging, shipping, delivery, and installation at each site.

K.2.2 Site Coordination. This section shall include:

a. Names and on-site work times of Contractor personnel to be at each installation site to perform site preparation work;
b. Special requirements for on-site movement of equipment and materials;
c. Interface connections and existing modification coordination and time required;
d. Electrical power shutdown coordination and time required; and
e. Government inspection coordination requirements.

K.2.3 Site layout. A site layout plan and design to include detailed placement of the radar system, tower, shelters, foundations, electrical distribution network, and modifications to roads or accesses at the site.

K.2.4 Foundations. A detailed foundation design, construction procedures, and list of material for the site, as required.

K.2.5 Electrical. A detailed plan and design of electrical installation requirements and a list of electrical and telephone materials required for each site. Include underground and above ground detailed plans. A detailed plan identifying existing site electrical wiring/ conduit locations is to be included. Include detailed plans and procedures for the grounding systems.

K.2.6 Structures. A detailed design, procedure, and plan of each structure to be installed at each site. Include interconnection/interface equipment designs, materials, and hookup procedures.

K.3.0 Site Drawings. The Contractor shall provide a complete set of drawings that plan, define, and describe all required construction and installation work to be performed at the Doppler weather radar site. Drawings shall include all site preparation and construction work required in preparation for radar installation and for installation of the radar system. Drawings shall identify electrical work (including ground grid), location of shelters and tower, fence location, and concrete work.

K.3.1 Drawing Coverage. Site drawings shall include coverage for the following areas:

a. Designation of soil or rock bearing surfaces to be protected by seal mat of structural fill concrete or compacted sand and gravel;

b. Structural fill and backfill material and gradation requirements;

c. Rock fill and backfill depth requirements;

d. Placement of structural fill concrete;

e. Describe use of crushed stone for surfacing material;

f. Location of pipe culverts and beveled end sections;

g. Areas for clearing;

h. Designate areas where topsoil is to be removed;

i. Indicate contours with grading requirements;

j. Indicate subgrade elevations for all roads, foundations, and paved areas;

k. Depth and dimensions for all excavations including footings, foundation walls, mats and slabs;

l. Denote elevations and slopes for fill and backfill;

m. Complete specification for tower pad and shelter foundations with locations;

n. Indicate all required electrical materials;

o. Site grounding system;

p. Location of service disconnect switch;

q. Drawing indicating all interconnects for power, control and instrumentation;

r. General locations for above ground conduit runs;

s. Location of all concrete with compressive strengths and required finish;

t. Location of sidewalk joint(s);

u. Splicing for reinforcement bars;

v. Location of construction joints for concrete work including required reinforcement;

w. Location of expansion joints;

x. Placement of sleeves, inserts, anchors, and all other embedded items prior to placement of concrete; and

y. Location of access road and parking area with specifications.

K.3.2 Site Drawing Set. The Contractor shall provide the following set of site drawings including the following:

a. General Site Drawings, including:
   (1) Site Grading Plan and Map;
   (2) Site Lines and Grades;
   (3) Foundation Arrangements - for tower and shelters for auxiliary generator, radar equipment, power conditioning, etc;
   (4) Section and Details - Grading, Foundations, and Concrete;
   (5) Section and Details - Roads and Fencing;
   (6) Road Profile and Cross Sections;
   (7) Site Cross Sections;
   (8) Riser Diagrams and Single Line Diagrams - Electrical;
   (9) Lighting and Power Elevations;
   (10) Lightning Protection and Grounding Plans;
   (11) Grounding Sections and Details;
   (12) Outline and Mounting for all systems and equipment;
   (13) Outline and Mounting for communications systems;
   (14) Interconnecting Diagrams;
   (15) Above Grade Grounding Installations; and
   (16) Topographic and Boundary Surveys.

b. Steel Tower Site Drawings, including:
   (1) Slab Foundation Layout;
   (2) Waveguide Bridge Layout;
   (3) Tower Master Erection; and
   (4) Top Plate Installation;

c. Shelter Facility Drawings.

d. Shelter Site Drawings, including:
   (1) Exterior Elevations;
   (2) Foundation Plans; and
   (3) Electrical Schematics & Power Distribution Panel.

K.3.3 Approval of Site Drawings. The Contractor shall submit the completed set of drawings to the Government for review and approval. Once the drawings have been accepted by the Government, changes shall require Government COTR approval.

K.3.4 As-Built Drawings. The Contractor shall submit a set of final site drawings, accurately indicating all as-built conditions, field modifications, and/or changes. All site drawings shall be updated to reflect approved changes and shall be provided to the Government 30 days after the completion of the radar system acceptance.

K.4.0 Site Preparation Material Test and Inspection Requirements.

K.4.1 Material Testing Agency. The Contractor shall submit, for Government approval, the qualifications of any testing agency to be used. Test reports, including results and interpretations of results, and certification of conformance with specified requirements shall be transmitted directly from the testing agency to the Government.

K.4.2 Government Inspection. All work shall be subject to inspection by the Government to assure conformance to the requirements of the Specification. The Contractor shall provide sufficient notice and shall make proper arrangements so that the Government may, at its discretion, witness all operations. Inspection by the Government shall not relieve Contractor of its responsibility for compliance with Contract requirements.

K.4.3 Government Access. The Government shall, at all times, have access to all site materials intended for use in the site preparation work.

K.4.4 Material Test Information. The Contractor shall submit reports of site material control tests and field density tests, one day after receipt of test results, to the Government. Government approval is required prior to the initiation of foundation work, fill, or backfilling. Reports shall include the following:

Table K-1
Material Test Reports

REPORT SUBMITTAL REQUIREMENTS	SUBMITTAL DATE
Reports of tests of gradation, liquid limit, and plasticity, index of fill and backfill materials.	1 DATC
Reports of tests of maximum dry density or maximum index density.	1 DATC
Other material test reports.	1 DATC
LEGEND	
DARGNP = Days after receipt of Government notice to proceed. DATC = Days after test completion. DPRF = Days prior to release for fabrication. DPT = Days prior to test.	

K.5.0 Site Preparation Foundation Concrete Documentation Requirements. The Contractor shall submit foundation concrete data to the Government, including the following:

Table K-2
Required In-process Foundation Concrete

REQUIRED CONSTRUCTION INFORMATION	SUBMITTAL DATE
Description of proposed admixtures	7 DARGNP
Statement of proposed concrete mixes	7 DARGNP
Certified test data and reports for materials and compressive strengths of mix designs	7 DARGNP
Identification of testing agency	7 DARGNP
Descriptive data, samples, certified test reports, and manufacturer's certification of compliance with specified requirements for the following: Reinforcing Steel; Joint filler; joint sealer; waterstops; vapor barrier; sheet materials for concrete curing; and membrane curing compounds.	7 DARGNP

Site drawings of reinforcement steel	14 DARGNP
Requalification of materials or mix proportions required as a result of changes or test failures, as follows: Mix proportions; and Test Reports	 10 DPRF 3 DATC
Certified test reports of cores and/or load tests	3 DATC

K.6.0 Site Preparation Electrical Documentation Requirements. The Contractor shall submit electrical drawings and/or manufacturer's catalogue descriptions data to the Government, including the following:

Table K-3

Electrical Documentation Requirements

REQUIRED CONSTRUCTION INFORMATION	**SUBMITTAL DATE**
All radome ventilation, temperature control, monitoring and heating equipment, including: a. Radome, front gate, shelters security equipment; b. All surge protection equipment; c. Aircraft warning light; d. Locations and wiring diagrams of junction boxes and material used; e. Conduit material Wire, cable and terminations; f. Lighting fixtures; g. Grounding material; h. Lightening protection material; and i. Service disconnect switch.	30 DARGNP
Documentation of all testing and calculations required.	10 DATC

APPENDIX L
GENERAL SITE PREPARATION AND INSTALLATION REQUIREMENTS

L.1.0 Scope. The work to be provided by the Contractor shall be for the Doppler weather radar acquisition site and remote sites. Work includes:

a. Radar Acquisition System (RAS) Site Preparation. RAS site work shall include all the civil, mechanical, and electrical preparation and construction work, including shelters, required by the radar Statement of Work and the Specification to prepare for system installation.

b. Radar Installation. Following site preparation work, the Contractor shall install and test the RAS at the operational site, including a Doppler weather radar system, tower, and associated equipment;

c. Remote Terminal Installation. Remote terminal installation includes site preparation work and installation of Remote Terminals and communications system at the WFO; and

d. Installation Tests. Installation tests includes preparation work and installation tests of the radar system data transmitted over the communication system prior to Acceptance Tests.

L.2.0 Site Preparation Work Requirements. The Contractor shall perform the following site preparation work:

L.2.1 Material and Labor. Furnish all materials and labor required for site preparation work.

L.2.2 Construction. Perform all construction work and install all materials and equipment necessary to support site preparation work.

L.2.3 Site Testing. Furnish all labor and equipment required for site preparation testing. The Contractor shall engage an independent testing laboratory, where required in the Civil Engineering sections of the Specification, to perform and certify all testing. Qualifications of the testing agency shall be submitted for Government approval. All electrical testing, including required grounding tests, shall be performed by a licensed electrician.

L.2.4 Geotechnical Work. Prior to the onset of site preparation, the Contractor shall obtain the services of a qualified geotechnical firm for the purposes of obtaining a

geotechnical analysis of the site. The geotechnical firm selected shall be approved by the Government. The geotechnical firm shall provide boring and related geotechnical data sufficient to determine the character and amount of the various classes of soil materials present at the site.

L.2.5 Access Road. The Contractor shall construct an access road from the nearest public access road to the site for construction, installation, and operation. The access road shall be a gravel road with a minimum width of 10 useable feet.

L.2.6 Parking Area. The Contractor shall construct a site parking area sufficient for 6 vehicles.

L.2.7 Tower Foundation. The Contractor shall construct a concrete foundation for the radar tower and install required anchor bolts in the foundation for tower installation.

L.2.8 Auxiliary Power Site Support. The Contractor shall provide all required equipment, accessories, and safety equipment to support the installation of auxiliary and conditioning power systems. A mechanical hood shall be provided if rotating machinery is used for either power conditioning or auxiliary power. Install fuel tanks and provide fuel for auxiliary and conditioning power systems during installation and acceptance.

L.2.9 Fence. The Contractor shall provide and install a security fence around the perimeter of the radar acquisition site. The Contractor shall provide a vandal proof hinge for fence gate, equivalent to Part #180-73, as supplied by Jamieson Company (1-800-527-6464). The Contractor shall provide certification that the fence meets Federal Specifications and requirements, as outlined in the fence appendix to the Specification.

L.2.10 Traffic Control. The Contractor shall provide for traffic control in the vicinity of the site in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) for streets and highways and the local governmental body or official having jurisdiction.

L.2.11 Landscaping. The Contractor shall landscape the complete radar acquisition site. In landscaping areas, seed mixture, fertilizer, mulch type, and application rate shall be as per requirements of the U.S. Soil Conservation Department/Agent, or appropriate local authority. After seeding, the area shall be raked to provide adequate seed cover, rolled to provide a compact seedbed, and then mulched. The Contractor shall provide certification that seeding, fertilization and mulching applications are in accordance with local requirements. The Contractor shall maintain seeded areas until Contract completion.

L.3.0 Shelter Installation. The Contractor shall install shelters to house radar data acquisition equipment, auxiliary power source, and power conditioning equipment.

L.3.1 Installation Work. The Contractor shall perform the following shelter installation work:

a. Unloading the shelters and setting on foundations. If necessary, Contractor will use spreader bars, during lifting and installation, to protect roof facing.

b. Remove and discard all internal packing material.

c. Mount covers on any unused penetrations into the equipment shelters.

d. Installation of an intrusion alarm system.

e. Installation of shelter tie-down brackets. Brackets shall be installed within 7 days after initial placement of shelters on foundation slabs.

f. If space between shelter and foundation is less than 1/4", the space shall be sealed with 30-year silicone caulk. Provide 1" to 1-1/2" drain slots, starting at corners at 48" intervals.

g. If space between shelter and foundation is more than 1/4", and depth is more than 1", the space shall be shimmed and grouted as follows:

(1) If length of gap is 48" or less, only 1 shim is required;

(2) If the gap is longer than 48", one shim is required every 48";

(3) If the gap is at the corner, install 1 shim 1-inch in from the end of the shelter on each side;

(4) If there is a partial gap, grout is required all around. (Do not mix grouting and caulking on the same Shelter);

(5) Mix grout per manufacturer’s instructions and force at least 4 inches under the Shelter;

(6) Clean the excess grout and allow to harden; and

(7) Provide 1 to 1-1/2" drain slots. Starting at the corners, cut drain slots at 48" intervals. Shims and grout will be supplied by the Contractor.

L.3.2 Keys. Provide a set of keys for each shelter installed at the site, including a set for the radome, and gate. Keys shall be as manufactured by Master Lock Company, Milwaukee, WI. Keys will have 2-1/2" vertical shackle clearance.

L.4.0 Tower and Radome Installation. The Contractor shall supply and install the radar tower and radome, including radome lighting (interior and exterior), vents and fans with associated controls, thermostats and controls, lightning protection system, obstruction light and power.

L.4.1 Pre-Installation Hold Point. The tower and radome shall not be installed until Government approval of site preparation and concrete foundation work is completed, and concrete test results has been obtained. The Contractor shall submit a complete set of updated drawings and specifications concerning the tower and radome design prior to installation. Government approval shall be required before installation proceeds.

L.4.2 Tower Installation. The Contractor shall furnish and install the radar tower. The tower shall meet the requirements of Section 3.4.1.1 of the Specification. The Contractor shall provide all labor, tools, and equipment required for tower installation. During installation, Contractor shall be responsible for all applicable safety regulations. Contractor shall provide site access to Government witnesses during tower installation.

L.4.3 Radome Installation. The Contractor shall install a radome that meets the requirements of Section 3.4.1.2 of the Specification.

L.4.3.1 High Wind Precautions. Radomes, in general, are not designed to meet peak wind loads until assembly is complete. The partially erected structure will exhibit increased deflections in high winds. The radome, when under construction, shall be restrained when winds are greater than 25 knots (46 km/hr) and when the installation crew leaves the site at the end of the day. A suitable method of restraining the radome shall be utilized. The installation supervisor shall be familiar with the site before installation begins. A final check shall be made to insure the anchor bolts are located within the required tolerances and base mounting ring is properly leveled. Any discrepancies noted during the radome installation shall be recorded and provided to the Government.

L.4.3.2 Considerations. The Contractor shall consider the following items prior to radome installation:

a. Height of radome foundation above deck;
b. Overhang of radome equator beyond the radome base ring;

c. Interior floor space available;
d. Clear space within radome;
e. Availability of electrical power and equipment such as crane lifting, scaffolding, compressors, etc;
f. Interference with other work at the site;
g. Weather history of the time of year during which the installation is planned; and
h. Time available to work and to complete installation.

L.5.0 Radar System and Equipment Installation and Testing. The Contractor shall install and test the radar system in accordance with the Specification.

L.6.0 Safety. The Contractor shall maintain all necessary barriers and safety precautions required to protect workers and the public from injury. All applicable Federal, State, and Local safety requirements shall be met.

APPENDIX M
RADAR OPERATOR'S TRAINING

M.1.0 Training. The Contractor shall provide Radar Operator's training. The following requirements shall apply to developing and conducting Radar Operator's training. The operational system shall be used to provide operator training for meteorologists and technical staff. Training shall be based on the Radar Operator's manual developed by the Contractor, and any required Contractor supplied additional materials. Radar Operator's training may be attended by WFO and Regional meteorologists and technicians and by OSF meteorologists, engineers, and technicians.

M.2.0 Training Course Requirements. The Contractor shall prepare an Radar Operator's training course. The Radar Operator's training course documents shall be prepared and presented in the Contractor's format.

M.3.0 Radar Operator's Course Requirements. The Radar Operator's training shall provide Government site staff with sufficient familiarization with the radar to perform successful radar monitoring and operations. Radar Operator's training shall use a hands-on approach to instruction. Graduates of the Operator's training course shall be able to follow the step-by-step procedures to:

a. Initialize and operate the radar;
b. Use and understand workstation commands for radar operations and displays;
c. Adjust radar parameters;
d. Monitor radar performance;
e. Turn the radar off, when necessary;
f. Stow the antenna, when necessary;
g. Initialize and operate the communication interfaces;
h. Initializing and operating fire detection and warning, and site security, monitoring, and reporting equipment;
i. Isolate a system fault to initiate a maintenance request;
j. Understand maintenance and repair Call-In procedures; and
k. Operate radar safety equipment.

M.3.1 Training Material. The Contractor shall provide all training material for each course including operator's manual sections and visual aids. Materials used during the class will be retained by the student upon completion of each class.

M.3.2 Course Length. The course shall not exceed five individual sessions of four hour each. The Government may require daily instruction to begin between the hours of 4:00 P.M. and 8:00 P.M. local time.

M.4.0 Reporting Requirements. The following quantity of copies of the preliminary Radar Operator's training material are required to be delivered to the Government: one (1) paper copy to the Contracting Officer; four (4) paper copies and one (1) disk copy of slides to W/OSO31; six (6) paper copies to W/OSO43 (OSF), and six (6) paper copies to W/CR. The following quantity of copies of the final Radar Operator's training material are required to be delivered to the Government: one (1) paper copy to the Contracting Officer; four (4) paper copies and one (1) disk copy of slides to W/OSO31; and six (6) paper copies to W/OSO43; and one (1) paper copy to each student in the class. All disk copies shall be IBM-PC-compatible 3.5 inch high-density computer disk in a mutually acceptable software application format. All paper documents shall be submitted on 8½ x 11 paper with foldouts in a 12 point font for text and 10 or 12 point font for tabular data. The Government shall have right to reproduce the Operator's training materials.